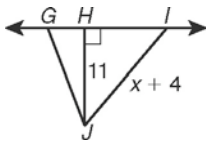
Name_____ Date_____ Class_____

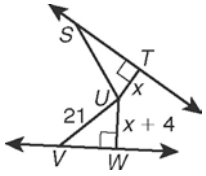
3-4 Assignment: Perpendicular Lines

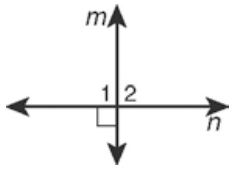
Name the shortest segment from the point to the line and write an inequality for *x*.

1.



2.





3. Complete the two-column proof.

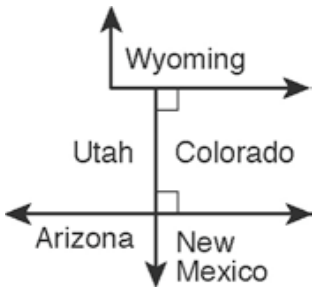
Given: $m \perp n$

Prove: $\angle 1$ and $\angle 2$ are a linear pair of congruent angles.

Proof:

Statements	Reasons
1. a. _____	1. Given
2. b. _____	2. Def. of $\perp$
3. $\angle 1 \cong \angle 2$	3. c. _____
4. $m\angle 1 + m\angle 2 = 180°$	4. Add. Prop. of $=$
5. d. _____	5. Def. of linear pair

4. The Four Corners National Monument is at the intersection of the borders of Arizona, Colorado, New Mexico, and Utah. It is called the four corners because the intersecting borders are perpendicular. If you were to lie down on the intersection, you could be in four states at the same time—the only place in the United States where this is possible. The figure shows the Colorado-Utah border extending north in a straight line until it intersects the Wyoming border at a right angle. Explain why the Colorado-Wyoming border must be parallel to the Colorado–New Mexico border.



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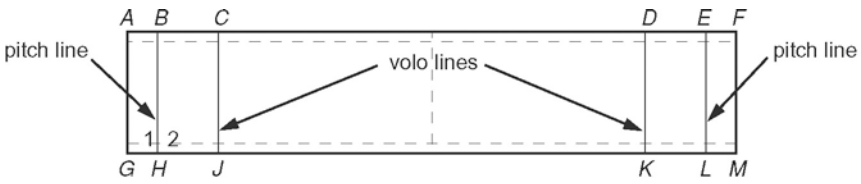
5. _____ If $m\angle 1 = m\angle 2$, what can you conclude?



A $\overline{BH} \perp \overline{GJ}$

B $\overline{AC} \perp \overline{BH}$

C $\overline{BH} \parallel \overline{CJ}$

D $\overline{AC} \parallel \overline{GJ}$

6. _____ The pitch lines are parallel, and the first pitch line is perpendicular to the long sides of the court. Which is a correct conclusion?

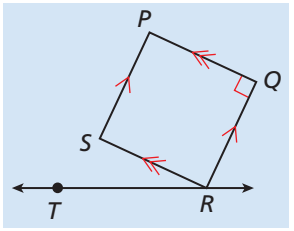
F BH = CJ

G $\overline{BH} \parallel \overline{CJ}$

H $\overline{EL} \perp \overline{AF}$

J $\overline{DK} \perp \overline{AF}$

In the diagram, which represents the side view of a mystery spot, $\overline{QR} \perp \overline{PQ}, \overline{PQ} \parallel \overline{RS}, \& \ \overline{PS} \parallel \overline{QR}.$



7. Prove $\overline{QR} \perp \overline{RS} \ \& \ \overline{PS} \perp \overline{RS}$

8. Prove $\overline{PQ} \perp \overline{PS}$

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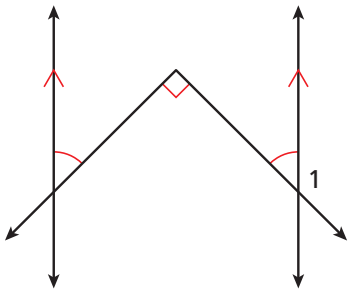
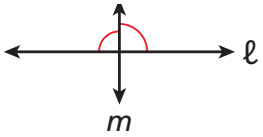
9. Draw a figure that shows the theorem, If two coplanar lines are perpendicular to the same line,
then the two lines are parallel to each other. (2 lines $\perp$ to same line $\rightarrow$ 2 lines $\parallel$.) is **not** true if the lines are not in the same plane.

10.
Write About It A ladder is formed by rungs that are perpendicular to the sides of the ladder. Explain why the rungs of the ladder are parallel.

11.
Multi-Step Find m$\angle$1 in the diagram. (*Hint:* Draw a line parallel to the given parallel lines.)



12. Prove: If two intersecting lines form a linear pair of congruent angles, then the two lines are perpendicular.



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13. Prove: If two coplanar lines are perpendicular to the same line, then the two lines are parallel to each other.